COLORADO RIVER RECOVERY PROGRAM Project No.: 140
FY-2012–2013 PROPOSED SCOPE OF WORK for:

Evaluating effects of non-native predator fish removal on native fishes in the Yampa River

Lead Agency: Larval Fish Laboratory
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Date: 29 April 2011 by K. Bestgen

Category:
__ Ongoing project
X Ongoing-revised project
__ Requested new project
__ Unsolicited proposal

Expected Funding Source:
X Annual funds
___ Capital funds
___ Other (explain)

I. Title of Proposal: Evaluating effects of non-native predator removal on native fishes in the Yampa River, Colorado.

II. Relationship to RIPRAP:

Green River Action Plan: Yampa and Little Snake Rivers
See RIPRAP at http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-action-plan.html

III.A.1. Implement Yampa Basin aquatic wildlife management plan to develop nonnative fish control programs in reaches of the Yampa River occupied by endangered fishes. Each control activity will be evaluated for effectiveness and then continued as needed.

III. Study Background/Rationale and Hypotheses:

Control actions for several non-native fish predators have been implemented in several rivers of the upper Colorado River Basin but effects of those removals on restoration of native fishes is unknown. Understanding the response of the native fish community to predator removal is needed to understand if removal programs are having the desired effect. Strong scientific inferences can be obtained only from studies conducted with a valid methodology. Some of the critical components of an experimental design to assess

effects of non-native predator fish removal include estimating the level and precision of the nonnative removal effort, achieving a large treatment (removal) effect, quantifying the response by native fishes to fish removal, comparing results in treatment and reference (control) reaches, replicating those treatments and controls in space and time, and controlling for extraneous confounding variables. I include some discussion of those points below to serve as the basis and justification for a proposed study design.

The summary report completed in March 2007 recommended additional sampling in anticipation that larger scale removals and environmental effects such as higher water or lower temperatures may lower predator abundance in the study reach and elicit a native fish response (Bestgen et al. 2007) such as happened in 2008. We intend to continue broader scale sampling including expanded effort in Lily Park to document such changes.

IV. Study Goals, Objectives, End Product: The goal of this work is to reliably estimate the response of resident native fishes to a known, relatively large, and well-estimated level of predator removal.

Specific objectives necessary to achieve that goal for Yampa River fish removal evaluation studies follow.

1. Select treatment and reference areas for study.
2. Implement removal of smallmouth bass and northern pike in treatment reaches in spring (mostly conducted in a different study).
3. Assess abundance of predators in treatment and reference reaches to determine removal effects.
4. Conduct additional removals of small smallmouth bass prior to summer and early autumn (mostly under project 125).
5. Analyze smallmouth bass otolith micro-increments to understand timing and intensity of reproduction in the Yampa River.
6. Estimate response of native fishes in autumn in control and treatment reaches after spring-summer predator removal, including increased emphasis on the Lily Park section of the Yampa River.

End Product: RIP annual reports submitted following the field seasons after sampling was conducted. We have also participated in the annual non-native fish workshops and presented data that was collected as recently as one month prior to the meeting. We completed a four-year data summary and evaluation (Bestgen et al. 2007) in March 2007. If another such effort is planned during this fiscal period (2012 or 2013), the budget will need to increase in that year.

V. Study area: Yampa River, Colorado

Treatment and reference reaches have been established in the Yampa River as a part of non-native predator removal studies. The upper study area consists of a 24 mile (RM 125-101) beginning upstream of Morgan Gulch and ending downstream of Little Yampa Canyon. One 12 mile reach has been designated the removal reach, and the other 12 miles has been designated the reference reach. This reach was chosen because it is relatively accessible and the reference reach has a sampling history (R. Anderson, Colorado Division of Wildlife) that will be valuable to assessing trends in fish abundance over time.

The other treatment area (no reference) is a 5-mile river reach in Lily Park. We plan to continue increased effort in the Lily Park reach of the Yampa River as we did in 2008, because it offers a substantially more intact native fish assemblage than the upstream reach and will give us insights into effects of removal in that setting. Sampling in that reach will also offer insights into longitudinal effects the river on the fish community, both for native and non-native species, which will allow us to put findings in the upstream reach into better perspective. This sampling is also consistent with increased nonnative fish predator removal effort planned under associated project 125 (Hawkins et al. 2010 synthesis report).

VI. Study Methods/Approach:

Study reaches were designated in spring 2003 following discussions with personnel from the Colorado Division of Wildlife. This included assignment of reference and treatment reaches. Removals will be implemented in spring from designated reaches during sampling designed to assess abundance and ultimately, remove, non-native predators. Additional sampling and removal will occur during sampling to estimate abundance of Colorado pikeminnow. Details of sampling and the history of sampling reach changes are summarized in Bestgen et al. (2007).

The plan at present is to mark predator fish on one or more passes in all reaches to assess their distribution, abundance, and size-structure. Removal efforts in treatment reaches will likely commence later in spring and will add to the data available to estimate abundance of predator fishes in reference and treatment reaches. A final pass or passes will be conducted post-runoff to assess fish abundance and enhance removal efforts. Recapture data will also be used to assess movement of fishes between reference and control reaches over time. We anticipate that a minimum of 3-5 sampling passes will be completed in the sampling area; the number of marking and removal passes is yet unknown and largely dependent on water levels.

Capture-recapture data collected in the sampling reaches will be used to generate estimates of abundance of non-native predator fishes following spring and early-summer sampling. These estimates will allow us to determine if we have achieved target levels of

reduction for fish predators. Additional summer and early autumn removals of small-bodied bass will be conducted in the reach as well with electric seines, as has been done in the past.

Small-bodied fishes evaluation.–In each of the reference and treatment reaches, we will identify suitable low-velocity channel margin areas for sampling. Low velocity shoreline areas and backwaters are typically the most sampled habitat types. We may also choose areas that appear like they will be available from year to year for sampling if similar areas can be found in each of the reference and treatment reaches. An effort will also be made to choose sampling areas in treatment and reference reaches that are similar in size and habitat characteristics. We have sampled mostly with an electric seine in the past several years although a backpack shocker and conventional seine have been used when turbidity limits sampling efficiency. Samples of each species captured are measured and weighed so that comparisons of size structure could be made. Non-native predators captured in treatment areas would be removed, fish captured in reference areas would be returned to backwaters. We would attempt to generate catch/effort estimates for all species captured, including non-native cyprinids, because these species may also show a response to removal of non-native fish predators in the reach. Sampling area and other aspects of the habitat would be quantified so that comparisons could be made between control and reference areas. Data available for comparison among treatment and reference areas would be fish community composition, density estimates based on effort or area sampled, and community size-structure. Large-bodied fish response data in the study area are collected during spring sampling in study 125.

We will also continue to conduct analyses to understand timing and intensity of smallmouth bass reproduction in the Yampa River. This will be accomplished by analyzing otolith daily increments of smallmouth bass collected and preserved in ethanol during past years (2002-2010 as available) and in 2012 and 2013. A key to this aspect of the study is to obtain data in several different hydrologic years with differing water temperatures to understand those effects on smallmouth bass life history, reproduction, and extensions to recruitment.

VII. Task Description and Schedule

Task 1. Prepare sampling equipment, obtain landowner permissions, scout sample sites.
Task 2. Small-bodied fish sampling.
Task 3. Large-bodied fish sampling.
Task 4. Data entry and analysis.
Task 5. Otolith analysis.
Task 6. Annual reporting.

VIII. FY-2012/2013 Work

– Annual report /early November each year.

Larval Fish Laboratory, 2012 Budget. Salaries include 25.1 % fringe rate. Overhead is calculated on all items (including salary plus fringe rate) at 17.5%.

Budget notes: We recognize the need to keep costs low, and have not increased the budget for this project again similar to that in 2011. We will need to pay increased salaries through some other means, and in the future as lack of increases is not sustainable.

Larval Fish Laboratory, FY2012

Task 1, Prepare sampling equipment

Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	10	511		$5,110
Senior technician (d)	7	195		$1,365
Technician (d)	5	145		$725
			subtotal	$7,200
Travel				
Per diem (d)	5	25		$125
Mileage (miles)	750	0.4		$300
			subtotal	$425
			Total	$7,625

Task 2 and 3, sample fishes

Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	15	511		$7,665
Senior technician (d)	80	195		$15,600
Technician (d)	120	145		$17,400
			subtotal	$40,665
Travel				
Per diem (d)	140	25		$3,500
Mileage (miles)	7500	0.4		$3,000
			subtotal	$6,500
Supplies				

gas	200	3		$600
oil	20	2.5		$50
props	2	200		$400
nets, seines, pens	4	52		$208
preservative	1	33		33
misc camp gear	1	175		175
Misc sampling gear	1	200		200
			subtotal	$1,666
			Total	$48,831

Task 4, data entry and analysis

Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	8	511		$4,088
Senior technician (d)	24	195		$4,680
Technician (d)	10	145		$1,450
			subtotal	$10,218

Task 5, otolith analysis

Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	8	511		$4,088
Senior technician (d)	20	195		$3,900
Technician (d)	25	145		$3,625
			subtotal	$11,613

Task 6, annual report preparation

Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	9	511		$4,599
Senior technician (d)	7	195		$1,365
Technician (d)	5	145		$725
			subtotal	$6,689
Travel				
planning mtg	2	500		$1,000
			subtotal	$1,000
			Total	$7,689
			Total tasks 1-5	$85,976

Larval Fish Laboratory, FY2013

Task 1, Prepare sampling equipment

Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	10	511		$5,110
Senior technician (d)	7	195		$1,365
Technician (d)	5	145		$725
			subtotal	$7,200
Travel				
Per diem (d)	5	25		$125
Mileage (miles)	750	0.4		$300
			subtotal	$425
			Total	$7,625

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Item				Cost
Labor	Units	Cost/unit		
Principal investigator (d)	15	511		$7,665
Senior technician (d)	80	195		$15,600
Technician (d)	120	145		$17,400
			subtotal	$40,665
Travel				
Per diem (d)	140	25		$3,500
Mileage (miles)	7500	0.4		$3,000
			subtotal	$6,500
Supplies				
gas	200	3		$600
oil	20	2.5		$50
props	2	200		$400
nets, seines, pens	4	52		$208
preservative	1	33		33
misc camp gear	1	175		175
Misc sampling gear	1	200		200
			subtotal	$1,666

			Total	$48,831

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			subtotal	$1,000
			Total	$7,689
			Total tasks 1-5	$85,976

IX. Budget Summary *[Provide total AND break-out by funding target (e.g. station)]*[*]

FY-2012 $85,976
FY-2013 $85,976
Total: $171,952

X. Reviewers *[For new projects or ongoing-revised projects, list name, affiliation, phone, and address of people who have reviewed this proposal.]*

XI. References

Bundy, J. M., and K. R. Bestgen. 2001. Evaluation of the Interagency Standardized Monitoring Program Sampling Technique in Backwaters of the Colorado River in the Grand Valley, Colorado. Unpublished report to the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. Larval Fish Laboratory Contribution 119.

Bestgen, K. R., C. D. Walford, and A. A. Hill. 2007. Native fish response to removal of non-native predator fish in the Yampa River, Colorado. Final report to the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. U. S. Fish and Wildlife Service, Denver, CO. Larval Fish Laboratory Contribution 150.